Claims 12-15 and 21-37 remain pending. Applicants note with appreciation the Examiner's indication that claims 12-14 and 27-30 are allowed.

Claims 15 and 31-35 were rejected under 35 USC 112, second paragraph, as being indefinite. The claims have been reviewed and revised so as to obviate the grounds for this rejection. In regard to the question Examiner's regarding the wavelength at which the emissivity is measured, it is noted that, as is well understood in the art, the emissivity of a material is the ratio of radiation emitted by a surface of the material to radiation emitted by a perfect radiator at the same temperature. The emissivity is changed according to temperature. Thus, in the present invention, the emissivity is a relative emissivity, i.e., relative to the radiation of the perfect radiator when the radiation emitted by the perfect radiator at 500°C is set at 1. Further, about 90% of wavelength emitted by the material is distributed within 2-20 μm. Therefore, the emissivity of the present invention, is measured in a wavelength range of e.g. 8-13 μm within 2-20 μm, and is a relative emissivity relative to the perfect radiator when the radiation emitted by the perfect radiator at 500°C is set at 1 in theory. See in this regard the specification page 2, lines 20-21.

Reconsideration and withdrawal of the rejection under 35 USC 112, second paragraph, is solicited.

As claim 15 was not rejected over the prior art, allowance thereof with claim 12 is solicited.

Claims 21-26 and 31-35 were rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in an enabling manner. In that regard the Examiner questions support for the limitation "said internal electrode has an emissivity less than 0.3", as recited in claims 21 and 31. In that regard it is respectfully noted that although the terminology used in the claims is not identically used in the specification, at

page 7, lines 23-25 it is described that "the internal electrode 23 and an external electrode 22 have platinum layers". Platinum is known to have an emissivity of 0.1. Therefore, the noted phrases in claims 21 and 31 are supported by the disclosure that the internal electrode has a platinum layer which is known to have the 0.1 emissivity, which is less than 0.3, consistent with those claims.

In view of the foregoing reconsideration and withdrawal of the rejection under 35 USC 112, first paragraph, is solicited.

Claims 21-23, 36 and 37 were rejected under 35 USC 103 as unpatentable over Sakurai et al. in view of Torisu et al. Applicants respectfully traverse this rejection.

In Sakurai, protective layers (4) are formed in parallel with each other on the external and internal surfaces of external and internal electrodes, to protect the external and internal electrodes. Further, Sakurai does <u>not</u> teach that the protective layer (4) of the internal electrode is different from that of the external electrode. While Sakurai discloses that the protective layer (4) may be formed on the internal surface of the internal electrode, a suitable thickness and a suitable porosity of the protective layer formed on the internal surface of the internal electrode are not disclosed. From the foregoing, one would understand that the same protective layer is provided on the external and internal electrodes.

In the present invention, the high-emissivity layer is a layer for effectively absorbing and transmitting heat. The high-emissivity layer has a porosity <u>more than 10%,</u> and a thickness of 5μm or more, preferably, a thickness in a range of 10-20 μm. When the high-emissivity layer is formed densely to some degree, that is, when the porosity of the high-emissivity layer is smaller than a predetermined value lower than 10%, it is difficult for a standard gas to reach the electrode surface; and therefore, oxygen concentration cannot be accurately detected.

If the porosity of the protective layer (4) of the external surface of the external electrode in Sakurai is more than 10%, the protective layer (4) cannot be used for protecting the external electrode. Therefore, the porosity of the protective layer would be understood to be less than 10%. Because insofar as can be determined, the same layer is provided for the internal electrode, the protective layer of the internal electrode is also less than 10% in Sakurai.

Torisu discloses a sensor without a heater. Although Torisu has a protective layer made of aluminum on an inner electrode to protect the inner electrode; the protective layer is not provided to effectively transmit heat from the heater to a solid electrolyte.

Thus, even if the teaching of Sakurai could be combined with the teaching of Torisu, claims 21-23, 36 and 37 would still not be obvious.

Claims 24-26 were rejected under 35 USC 103(a) as being unpatentable over Sakurai in view of Torisu and Pollner. Applicants respectfully traverse this rejection.

Like Torisu, Pollner discloses a sensor without a heater. Moreover, Pollner only discloses a protective layer for protecting the external surface of the external electrode. The protective layer of the external electrode is exposed to exhaust gas; whereas, the protective layer of the internal electrode is exposed only to the standard gas. Therefore, the environments of the protective layer of the external electrode is very different from that of the protective layer of the internal electrode. Accordingly, the skilled artisan would not obviously apply the protective layer of Pollner directly as the protective layer of Sakurai.

In the present invention, the high-emissivity layer is not used as a usual protective layer for protecting electrodes; it is used for effectively transmitting heat from the heater to the solid electrolyte; and, therefore, the high-emissivity layer has a suitable thickness and a suitable porosity distinct from the teachings of the prior art of record.

Thus, even if the teaching of Sakurai could be combined with the teaching of Torisu, and the teaching of Pollner, claims 24-26 are not obvious.

Claims 21-23, 36, 37 were rejected over Torisu in view of Sakurai, Maurer or Ker and Pollner. As explained above, the environment of the protective layer of external electrode is very different from that of the protective layer of the internal electrode, and the high-emissivity layer of the present invention is for effectively <u>transmitting heat</u> from the heater to the solid electrolyte. Therefore, the protective layer of the external electrode of the record prior <u>cannot</u> would not "obviously" be directly used for the protective layer of the internal electrode of the prior art and the structure claimed is <u>not</u> suggested by the prior art of record.

Thus, even if the prior art teachings noted by the Examiner are considered, claims 21-26, 36, 37 are still not obvious.

Claims 32-35 were rejected over Ker in view of Agarwal. Ker discloses a heater adjacent to an inner electrode, and Agarwal discloses a heater made of SiN, AlN and SiC. However, in amended claim 32, the heater <u>itself</u> has an emissivity of 0.6 or more to effectively transmit heat from the heater to the solid electrolyte without heat accumulation. That is, in the present invention, to solve the problem of the heat accumulation of the heater disposed within the solid electrolyte, the high-emissivity layer is provided on the outer surface of the heater or is the heater itself. Ker does not disclose the problem of heat accumulation, and does not disclose a heater having a high emissivity itself. In Agarwal, because the heater is disposed around the solid electrolyte, there is no problem of heat accumulation either.

Thus, even if the teachings of Ker and Agarwal could be combined, claims 32-35 are not obvious.

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All objections and rejections having been addressed it is respectfully submitted that the present application is in condition for allowance and a Notice to that effect is solicited.

Respectfully submitted,

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